



Australian Government

MSL973002 Prepare working solutions

Release: 1

MSL973002 Prepare working solutions

Modification History

Release 1. Supersedes and is equivalent to MSL973002A Prepare working solutions

Application

This unit of competency covers the ability to prepare working solutions and to check that existing stocks of solutions are suitable for use. Working solutions include those required to perform laboratory tests. Personnel are required to calculate quantities and make dilutions.

This unit of competency is applicable to laboratory assistants working in all industry sectors.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

Nil

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Make up working solutions	1.1	Identify the relevant standard methods for solution preparation
		1.2	Assemble specified laboratory equipment
		1.3	Select and prepare materials and solvent of specified purity
		1.4	Measure appropriate quantities of reagents for solution preparation and record data
		1.5	Prepare labels and log solution details in laboratory register

		1.6	Transfer solutions to appropriately labelled containers
2	Check existing stock of solutions	2.1	Monitor shelf life of working solutions and identify those that are unfit for use according to laboratory procedures
		2.2	Replace out-of-date or reject solutions according to laboratory procedures
3	Maintain a safe work environment	3.1	Use appropriate safety procedures and personal protective equipment (PPE) to ensure personal safety and that of other laboratory personnel
		3.2	Store reagents and clean/store glassware and equipment in accordance with workplace procedures
		3.3	Minimise generation of waste and environmental impacts
		3.4	Clean up spills using appropriate techniques
		3.5	Ensure the safe collection of laboratory and hazardous waste for subsequent disposal

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the competence of testing and calibration laboratories,

laboratory safety, quality management and laboratory glassware

- national work health and safety (WHS) standards and codes of practice, national environmental protection measures, and national measurement regulations and guidelines
- specific codes, guidelines and procedures, such as National Association of Testing Authorities (NATA) accreditation requirements and principles of good laboratory practice (GLP)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS); safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; and waste minimisation and safe disposal procedures
- workplace procedures and standard methods for preparing working solutions

Working solutions

Working solutions include, but are not limited to, one or more of:

- solutions required for diagnostic/analytical and limit tests in food and chemical laboratories, such as sulphates, chlorides and heavy metals
- staining solutions for standard diagnostic/analytical procedures in biomedical/environmental laboratories, such as cell staining, fixation of cells and tissues, suspension of cells and titrimetric indicators
- solutions required for laboratory maintenance and disinfection, such as 70% ethanol and hypochlorite

Safety procedures

Safety procedures include, but are not limited to, one or more of:

- use of PPE, such as safety glasses, gloves and coveralls
- correctly labelling reagents and hazardous materials
- handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer instructions and workplace procedures and regulations
- regular cleaning and/or decontamination of equipment
- prompt clean-up of spills in accordance workplace procedures

WHS and environmental management requirements

WHS and environmental management requirements include:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be

compromised at any time

- applying standard precautions relating to the potentially hazardous nature of samples
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSL973002A Prepare working solutions

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL973002 Prepare working solutions

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- safely preparing at least five (5) examples of correctly labelled working solutions, including calculation of the quantities involved and any dilutions required
- checking that existing stocks of working solutions and identifying those unfit for use, including:
 - noting turbidity to exclude absorption of moisture
 - noting deposits to exclude microbial contamination or chemical degradation
 - noting crystals to exclude evaporation
 - noting colour changes indicating a pH shift with solutions containing indicators
 - checking expiry dates on solution containers
- following workplace procedures for the safe use of hazardous chemicals, laboratory glassware and equipment
- accurately labelling and storing solutions in accordance with workplace procedures
- safely cleaning up spills and collecting/disposing of waste in accordance workplace procedures
- recording and presenting data accurately and legibly.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- concepts of metrology, including:
 - all measurements are estimates
 - measurements belong to a population of measurements of the measured parameters
 - precision, accuracy and significant figures
 - sources of error, uncertainty and repeatability
 - traceability
- international system of units (SI)
- concentration terms, such as % w/w, % w/v, % v/v, ppm (mg/L) and molarity
- basic theory of acids, bases, salts, buffers and neutralisation
- what affects solubility
- difference between aqueous and organic solutions

- periodic table, symbols of the elements, atomic weights, and difference between elements and compounds
- chemical formulae
- workplace procedures for preparing solutions
- calculations required to prepare specified amounts of solutions of specified concentration
- use of material safety data sheets (MSDS) and workplace procedures for preparing, handling and disposing of solutions and cleaning up spillages
- relevant hazards, work health safety (WHS) and environment requirements.

Assessment Conditions

- Judgement of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL922001 Record and present data
 - MSL943002 Participate in laboratory or field workplace safety
- Holistic assessment methods include:
 - inspection of working solutions prepared, labelled and stored by the candidate
 - review of solution records and workplace documentation completed by the candidate
 - feedback from peers and supervisors
 - observation of the candidate preparing working solutions
 - review of calculations for concentration and dilutions completed by the candidate
 - oral or written questioning about solution preparation steps, calculations, common hazards and safety procedures.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - a standard laboratory equipped with appropriate reagents and equipment, such as pH meters; balances; magnetic stirrers, water baths and hot plates; measuring cylinders, beakers, conical flasks, volumetric flasks, pipettes and burettes; filter papers and funnels; and fume cupboards
 - standard methods and workplace procedures

- containers and storage facilities.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience.
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment OR
 - having consulted with a laboratory about performing the competency being assessed within the last twelve months.

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